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ness in a cottage seems always more real than it does in a gorgeous palace. It is not wasted in large rooms—it is concentrated—a great deal of love in a small space—a great, great deal of joy and hope within narrow walls, and compressed, as it were, by a low roof. Is it not a blessed thing that the most moderate means become enlarged by the affections?—that the love of a peasant within his sphere, is as deep, as fervent, as true, as lasting, as sweet, as the love of a prince?—that all our best and purest affections will grow and expand in the poorest *worldly* soil?—and that we need not be rich to be happy? James felt all this and more when he entered his cottage, and was thankful to God who had opened his eyes, and taught him what a number of this world's gifts, that were within even his humble reach, might be enjoyed without sin. He stood—a poor but happy father within the sacred temple of his home; and Andrew had the warm heart of an Irishman beating in his bosom, and consequently shared his joy.

"I told you," said James, "I had the *true temperance cordial* at home—do you not see it in the simple prosperity by which, owing to the blessings of temperance, I am surrounded?—do you not see it in the rosy cheeks of my children, in the smiling eyes of my wife—did I not tell truly that she helped to make it? Is not this a true cordial," he continued, while his own eyes glistened with manly tears, "is not the prosperity of this cottage a *true temperance cordial*?—and is it not *always* on draught, flowing from an ever-filling fountain? Am I not right, Andrew; and will you not forthwith take my receipt, and make it for yourself? You will never wish for any other: it is warmer than ginger, and sweeter than anniseed. I am sure you will agree with me that a loving wife, in the enjoyment of the humble comforts which an industrious *sober* husband can bestow, smiling, healthy, well-clad children, and a clean cabin, where the fear of God banishes all other fears, make

THE TRUE TEMPERANCE CORDIAL!"

## THE SAP IN VEGETABLES.

### FIRST ARTICLE.

BOTANISTS describe two kinds of vegetable sap; the one is called the ascending or unelaborated sap, the other the descending or elaborated sap. If a young branch be cut across in the spring season, the newly exposed surfaces will be found rapidly to cover themselves with a dew, especially that portion which is continuous with the trunk—this moisture is the ascending sap: while if during the summer or autumn a piece of twine be tightly drawn and knotted round a young branch of lilac, the part above this ligature will shortly become swollen, and will bulge out on every side, in consequence of an impediment having been thus presented to the downward flow of the descending sap, which will be therefore forced to accumulate in the situation described. The reader may perceive that the origin from whence these two kinds of sap are derived, their chemical composition, the part of the vegetable through which they pass, the causes which produce the ascent of one and the descent of the other, together with the uses of both in the vegetable economy, are questions of great interest, as well to the farmer as the horticulturist.

The source from whence the ascending sap is derived is the aliment absorbed by the roots from the soil. This aliment consists essentially of two substances; one of these being sufficiently familiar, namely, water; and the other commonly existing in the atmosphere under the form of gas or air, but likewise capable of solution in water, namely, carbonic acid; this substance is known to every one as the cause, by its escape, of the boiling appearance seen in freshly uncorked soda water. These two substances constitute the necessary aliment of vegetables: at the same time it is notorious that various matters, such as manures, earths, &c, greatly facilitate the growth of plants; but these matters produce this effect either by supplying a greater quantity of carbonic acid, or by acting in a manner similar to condiments; for in the same way as spices taken into the stomach along with food invigorate the digestive power, so do many minerals, when absorbed by the roots, operate in promoting the nutrition of vegetables.

The chemical composition of the ascending sap is chiefly a solution of sugar and gum in water. In the northern states of America, sugar in large quantities is obtained from some species of maple, principally the sugar maple and swamp maple of Canada, by boring the stem, collecting the ascending sap which flows from the wound, and evaporating away its

watery portions. It is an interesting question, from whence proceed the sugar and gum contained in this ascending sap? The only satisfactory reply to this question is, that these substances become formed out of the water and carbonic acid absorbed from the soil; but this is a transformation which cannot be effected by the most expert chemist, so that we find in this, as in many other instances, a living body is a laboratory in which Nature executes changes far transcending the loftiest efforts of man's ingenuity.

The part of the vegetable through which the sap ascends can be easily shown in any of the ordinary trees of this country. If a branch from a currant shrub be placed with its inferior and newly cut surface immersed at first in a solution of green vitriol and afterwards in an infusion of nutgalls, the course through which these fluids ascend may be traced by the black colour produced by their mixture; for every one knows that a mixture of green vitriol and nutgalls produces ink, and in the experiment just described, the solutions of these substances following each other in their ascent, inscribe in a manner on the interior of the branch the path which they successively pursued. This course will be found to exist between the bark and the pith, these parts being quite unchanged, while the intermediate portion of wood will be deeply coloured.

The causes which produce the ascent of the sap are of a very powerful nature. The celebrated Hales ascertained that a vine branch, in a few days, sucked up water with a force equal to the weight of sixteen pounds on the square inch: this was a power greater than atmospheric pressure; and when it is recollected that the pressure of the atmosphere is capable of lifting thirty-three or thirty-four feet of water in a common pump, some estimate may be formed of the force with which the sap ascends. This ascent appears to be produced by the influence of two causes: the one, a quality peculiar to living beings, by which the buds in common with all growing organs are capable of attracting or sucking towards them the juices necessary for their nutrition; and in agreement with this, the sap is found to ascend in the first instance near the buds: the other, a general property of all matter which has been but lately discovered. This latter property, which has been called endosmose, is found to operate when two fluids of different densities are separated by a membrane. Under these circumstances, and in obedience to an attraction for each other, both fluids pass through the membrane, and mix together; but the denser and thicker fluid finding a greater difficulty to penetrate the membrane than the lighter and thinner, consequently passes through in less quantity. To illustrate this, let us suppose a bladder containing a little syrup, and placed in a vessel of water, and we will have the conditions necessary for endosmose: the syrup and water will both pass through the bladder in opposite directions, but a greater quantity of water will pass into the syrup, than of the latter into the water. It will be evident to the reader that this excess of thin liquid passing into the denser will constitute a force or power which will require an equal force to neutralise it; and it has been ascertained that the tendency of water to penetrate a membrane for the purpose of mixing with a syrup of once and a third its own specific weight, required a force equal to sixty-three pounds on the square inch to overcome it. Now, a plant growing in the ground is similarly circumstanced to the bladder in this experiment: its roots furnished with extremities of spongy membrane are interposed between thin water and carbonic acid externally, and a syrupy solution of sugar and gum internally. Now, under these circumstances we need not be surprised if an endosmose should operate, abundantly sufficient to elevate the sap with a force even greater than that determined by Hales.

The use of the ascending sap in the vegetable economy is the last subject which we shall consider in this article. On a future occasion we shall endeavour to show that it is out of the ascending sap that the descending or elaborated sap is chiefly formed; but besides this utility of the ascending sap, as the source of the descending sap, the former has special functions of its own to perform. If we inquire what period of the year is the ascending sap in greatest quantity, we shall find it to be during the spring season. Now, this is the time when the buds become pushed out into branches, and the young leaves peep forth: the roots also during this season increase in thickness. Another means which we possess of ascertaining the uses of this sap, is by protecting plants from the influence of light: in total darkness no elaborated sap is ever formed; therefore, whatever vegetation may then take place, must be solely at the expense of the ascending sap. Under such

circumstances the plant becomes very succulent, its stems grow to a great length, no vegetable fibre can be detected in its substance, its colour is blanched, it possesses no bitter or aromatic properties, and it does not develop flowers. Potatoes growing in a dark cellar, or celery protected from the light, by earth heaped around its foot-stalks, will afford familiar examples. These considerations lead us to the belief that out of the ascending sap is formed the fleshy part of vegetables, which, by its production, increases the length of the stem, and the thickness of the roots. In our next article we will describe the most remarkable properties of the ascending sap.

T. A.

### MEN OF GENIUS.

HAVE any of our friends any persons of this description amongst the young men of their acquaintance? We think they must, for they are very plentiful: they are to be found every where. We ourselves know somewhere about half a dozen of one kind or other; and it is of these different kinds we purpose here to speak.

Before doing this, however, let us remark, that the sort of geniuses to whom we allude are to be found amongst young men only: for, generally speaking, it is only while men are young that they are subject to the delusion of supposing themselves geniuses. As they advance in life, they begin to suspect that there has been some mistake in the matter. A few years more, and they become convinced of it; when, wisely dropping all pretensions to the character, they step quietly back into the ranks amongst their fellows.

It is true that some old fools, especially amongst the poetical tribe, continue to cling to the unhappy belief of their being gifted, and go on writing maudlin rhymes to the end of the chapter. But most men become in time alive to the real state of the case, and, willingly resigning the gift of genius, are thankful to find that they have common sense.

While under the hallucination alluded to, however, the sort of geniuses of whom we speak are rather amusing subjects of study. We have known a great many of them in our day, and have found that they resolve themselves into distinct classes, such classes being formed by certain differing characteristics and pretensions: the individuals of each class, however, presenting in their peculiarities a striking resemblance to each other.

First comes, at any rate in such order shall we take them, the Poetical Genius. This is a poor, bleached-faced thing, with a simpering, self-satisfied countenance, an effeminate air and manner, and of insufferable conceit. It is an insolent creature too, for it treats you and everybody with the most profound contempt. Its calm, confident smirk, and lack-a-daisical look, are amongst the most provoking things in nature, and always inspire you with a violent desire to kick it out of your presence.

The poetical genius is by far the most useless of the whole tribe of geniuses. Wrapt up in his misty, maudlin dreams of cerulean heavens, and daisied meads, and purling rills, he is totally unfitted for the ordinary business of ordinary life. He is besides not unfrequently a little deranged in his upper works. Having heard, or having of himself imbibed a notion, that madness and genius are allied, he, although of perfectly sane mind originally, takes to raving, to staring wildly about him, and to practising various of the other extravagances of insanity, till he becomes actually half cracked: some of them indeed get stark staring mad.

The poetical genius is addicted to tea parties, and to writing in albums. He also much affects the society of tabbies: for of all his admirers he finds them the most liberal and indiscriminate in their praise. These good creatures drench him with weak tea, and he in return doses them with still weaker poetry. This is the class that supplies the newspapers with the article just named, at least so named by courtesy, figuring therein as J. F.'s and P. D.'s, &c.

The next class of geniuses which we propose to consider, is the Oratorical Genius. This person labours under the delusion of supposing himself a second Demosthenes. He is a great frequenter of debating societies, and other similar associations, where he makes long, prosy, unintelligible speeches—speeches full of mist and moonshine, in which no human being can discover the slightest trace of drift or purpose. These frothy, bubble-and-squeak orations the young gentleman prepares at home, fitting himself and them for public exhibition

by raving and ranting them over in his own room, to the great annoyance of his neighbours.

These speeches, when they do not produce nausea, which they are very apt to do, or at least a disagreeable feeling of squeamishness, are powerful soporifics, and, possessing this quality, would be rather grateful than otherwise, if one were in bed when within hearing of them; but unhappily this pleasant effect is neutralised by the roaring and stamping that accompanies their delivery: so that this sort of orator is in reality a positive nuisance.

The oratorical genius is nearly, if not every bit, as conceited as the poetical genius. He has the same provoking, self-satisfied simper, and is in other respects a still greater bore, for his forensic habits and practices, without furnishing him with a single additional idea, have given him an unhappy fluency of speech, which he himself mistakes for eloquence, and with which he mercilessly inundates every one whom he can get beneath the spout of his oratorical pump. Every thing he says to you is said in set phrase—in the stiff, formal, affected language of the debating society. His remarks on the most ordinary subjects are all regular built speeches—dull, long-winded, prosy things, smelling strong of the forum.

We know a speculative or debating society man the moment he opens his mouth. We know him by his studied, prolix phraseology, and much, much do we dread him, for of all earthly bores he is the most intolerable. To be obliged to listen to his maudlin philosophy and misty metaphysics—for they are all to a man philosophers or metaphysicians—is about one of the most distressing inflictions we know.

The next genius on our list is the Universal Genius, perhaps the most amusing of the whole fraternity. This gentleman, although perfectly satisfied that he is a genius, and a very great genius too, does not know himself precisely in what he excels. He has no definite ideas on the subject, and in this respect is rather at a loss. But he enjoys a delightful consciousness of a capacity that would enable him to surpass in anything to which he might choose to devote himself, and that in fact he does surpass in everything. His pretensions therefore rest on a very broad basis, and embrace all human attainments. He is in short a universal genius. This gentleman is very apt to assume peculiarities in dress and exterior appearance, to wear odd things in an odd way, and to sport a few eccentricities because he has heard or imagines that all geniuses are eccentric. These are common and favourite expedients with the would-be genius, who moreover frequently adds dissipation to his distinguishing characteristics, it being a pretty general notion that genius is drunken, and of a wild and irregular life.

To make out this character, then, the universal genius takes to breaking the public lamps, wrenching off bell-handles, kicking up rows in taverns with the waiters and others, and on the streets with the police; gets his head broken and his eyes blackened; keeps late hours, and goes home drunk every night; and thus becomes a genius of the first order. This sort of genius, we have observed, is much addicted to wearing odd sorts of head-dresses, fantastic caps all befurred and betasselled, and moreover greatly affects the bare throat, or wearing only an apology for a neckcloth, with shirt-collar turned down—in this aiming at a fine wild brigandish sort of look and appearance, much coveted by geniuses of a certain order.

Nature, however, does not always favour those ambitious attempts at the bold and romantic, for we often find them associated with snub noses, lantern jaws, and the most stupid and unmeaning countenances, that express anything but a consonance of character with pretension. We have known geniuses of this kind—the bare-necked and turned-down-collared—set up for romantic desperadoes on the strength of a hairy throat and a pair of bushy whiskers.

The great class of universal geniuses now under consideration may, on close inspection, be found to subdivide itself into several minor classes, including the Sublime Genius, the Solemn Genius, and another tribe which has hitherto been, we rather think, without a name, but which we shall take the liberty of calling the Dirty Genius. This is a curious species of the race. The dirty genius delights in unkempt locks, which he not only allows but encourages to hang about his face and behind on his coat collar, in large tangled filthy looking masses. He delighteth also in an unwashed face, in dirty linen, and in a general slovenliness and shabbiness of apparel. The pretensions of this genius are very high; for he affects to be superior to all the common observances of